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fact that fertilization is very easily demonstrated in normally fertilized species makes the writer confident that the failure to find it in *B. coelestis* is evidence that it does not occur. The figures show only topography, without any details of the chromatin situation. A careful counting of chromosomes at critical stages, and a few figures at the stages which show whether a form is apogamous or not, would have extended the paper but little, and would have made unnecessary any further work upon the subject; but as it is, a forthcoming paper will deal with these details, the present one being preliminary.—CHARLES J. CHAMBERLAIN.

Spermatogenesis in Mnium.—As a result of their studies of several species of mosses, the Drs. VAN LEEUWEN-REIJNVAAN reported that in the last division of the spermatogenous cells a second numerical reduction of chromosomes takes place. In a species of *Mnium* having eight chromosomes in the last division, two long and two short chromosomes pass to the daughter cells. WILSON,[21] studying *Mnium hornum*, in a preliminary note announces that no such reduction is found, and that the gametophyte number is constant throughout spermatogenesis. The resting nucleus before the final division is quite large and contains a small nucleolus. A continuous spirem is not present, and the chromatic material appears as a number of small masses from which the chromosomes are formed. In the final division the axis coincides with the long axis of the cell, there being no diagonal division. Six chromosomes can easily be distinguished in the last division, and it is clear that no such reduction as described by the Drs. VAN LEEUWEN-REIJNVAAN takes place in *Mnium hornum*.

It is to be hoped that the final paper will also deal with fertilization, for many investigators find some difficulty in accepting the account given by the Drs. VAN LEEUWEN-REIJNVAAN.—W. J. G. LAND.

Hydrogen bacteria.—The epoch-making researches of WINOGRADSKI (1887–) on the sulfur, nitrite, and nitrate bacteria established the important fact of the existence of non-chlorophyll organisms that are obliged to manufacture their organic food by energy obtained from the oxidation of various simple inorganic substances. In 1906 various investigators reported the existence of bacteria that can oxidize hydrogen as the source of energy for assimilating CO_2. The forms were shown to be capable of using organic food as well, and are therefore facultatively autotrophic, in contrast to the obligate autotrophic forms studied by WINOGRADSKI. LEBEDEFF[22] now makes a preliminary report of the main results of an extensive study of the metabolism of these forms. The fixing of 100 c.c. of CO_2 requires the oxidation of 500–1500 c.c. of H_2. The oxygen for the process is best obtained from atmospheric oxygen, but in absence of it nitrates can be decomposed as its source. The oxidation of H_2 still continues in the presence of organic food, but no CO_2 is fixed in that case.—WILLIAM CROCKER.

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[21] WILSON, M., Preliminary note on the spermatogenesis of *Mnium hornum*. Annals of Botany **24**:235. 1910.

[22] LEBEDEFF, A. J., Ueber die Assimilation des Kohlenstoffes bei Wasserstoff oxydierenden Bakterien. Ber. Deutsch. Bot. Gesell. **27**:598–602. 1910.